5,585,804 1.KT

US-CL-CURRENT: 343/757,343/760

33/270

US-PAT-NO: 5760739
DOCUMENT-IDENTIFIER: US 5760739 A
TITLE: Method and apparatus for aiming a directional **antenna**
DATE-ISSUED: June 2, 1998
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Pauli; Richard A.	Seattle	WA	98119	N/A

367 156

US-CL-CURRENT: 342/359,343/757 ,343/760

ABSTRACT:
A method and apparatus for aiming a satellite dish includes an adjustable gnomon. The adjustable gnomon is calibrated. Using setting information generated by computer softwvare, a user sets the gnomon according to the calibration numbers returned by the computer software. The user then lock the setting into place. After locking the gnomon into position, the user employs the gnomon to aim a satellite dish or other directional **antenna**. Aiming the **antenna** requires **aligning the antenna** such that a shadow cast by the gnomon substantially coincides with a predetermined target.

CLAIMS:

What is claimed is:

1. A method for aiming a mounted directional **antenna** having a predetermined target to an associated transmitter or receiver, comprising the steps of:

a) obtaining setting information for an adjustable gnomon;

b) adjusting said adjustable gnomon according to said setting information; and

c) **aligning** the mounted **antenna** such that a shadow substantially coincides with
the predetermined target to thereby aim the **antenna**.

2. The method as recited in claim 1, wherein step (a) further comprises:

(i) entering location information into computer software, said computer
software executing on a computer to output said setting information; and

(ii) obtaining said setting information from said output of said computer
software.

3. The method as recited in claim 1, wherein step (b) further comprises:

(i) rotating said adjustable gnomon in azimuth according to said setting
information;

(ii) rotating said adjustable gnomon in elevation according to said setting
information; and

(iii) moving said adjustable gnomon along its transversal axis according to
said setting information; and

(iv) locking said adjustable gnomon into place after performing step (I)
through step (iii).

4. The method as recited in claim 1, wherein step (b) further comprises:

(i) placing a first CAG line across said directional **antenna**,

according to said
setting information; and

(ii) placing a second CAG line across said directional **antenna** according to said setting information such that said second CAG line crosses said first CAG line.

5. The method as recited in claim 4, wherein said first CAG line has a first end and a second end, said first end permanently attached to a predetermined point and wherein:

step (i) comprises the step of affixing said second end to a point according to said setting information and step (ii) comprises the step of affixing each end of said second CAG line to distinct point according to said setting information.

6. The method as recited in claim 1, wherein step (b) comprises the steps of:

(i) attaching a target to a target holder; located behind said directional **antenna**;

(ii) positioning said target holder in accordance with said setting information; and

(iii) locking said target holder in place.

7. The method as recited in claim 1, wherein step (c) comprises the step of:

rotating said directional **antenna** until said shadow substantially coincides

with said target.

8. An apparatus for aiming a directional **antenna** based on adjustable gnomon setting information, comprising:

a gnomon having calibration marks; and

adjusting means for adjusting said gnomon according to said setting information using said calibration marks.

9. The apparatus as recited in claim 8, wherein said adjusting means comprises:

first rotating means for adjusting said gnomon in azimuth;

second rotating means for adjusting said gnomon in elevation; and

transversal adjusting means for adjusting said gnomon along its transversal axis.

10. The apparatus as recited in claim 8, wherein said calibration marks are located on said directional **antenna** and wherein said adjusting means comprises:

a plurality of CAG lines, wherein said CAG lines extend between calibration marks according to said setting information, such that said plurality of CAG lines cross, thereby forming a cross shadow pattern on said directional **antenna**.

11. The apparatus as recited in claim 10, wherein said lines are secured in

place by notches co-located with said calibration marks.

12. The apparatus as recited in claim 11, wherein there are two CAG lines.

13. The apparatus as recited in claim 8, wherein said calibration marks comprises:

first marking and lines corresponding to the time of day; and second markings lines corresponding to the position of the sun at a given time of day at a particular location on the earth, wherein the intersection of a first marking line and a second marking line is a target corresponding to a particular location at a particular time.

14. The apparatus as recited in claim 8, wherein said adjusting means comprises:

a target holder located behind said directional **antenna,** said target holder can be movably displaced behind said directional **antenna,** said target holder holding a target.

15. A directional **antenna** having a predetermined target located thereon, comprising:

an adjustable gnomon for aiming the directional **antenna** to a transmitter or receiver,

one or more calibration marks located on said adjustable gnomon that indicate calibration settings for adjusting said adjustable gnomon to aim the directional **antenna** toward an associated transmitter or receiver;

and

aligning means for aligning said directional **antenna** such that a shadow cast by said adjustable gnomon substantially coincides with the predetermined target to thereby aim the directional **antenna**.

16. The directional **antenna** of claim 15, wherein said adjustable gnomon:

first rotating means for adjusting said gnomon in azimuth;

second rotating means for adjusting said gnomon in elevation; and

transversal adjusting means for adjusting said gnomon along its transversal axis.

17. The directional **antenna** of claim 15, wherein said calibration marks are located on a face of the directional **antenna** and wherein said adjusting means comprises:

a plurality of CAG lines, wherein said CAG lines extend between calibration marks according to setting information, such that said plurality of CAG lines cross, thereby forming a cross shadow pattern on said directional **antenna**.

18. A directional **antenna** system for aiming a directional **antenna** toward an associated transmitter or receiver, comprising:

a directional **antenna**, having a predetermined target located thereon;

an adjustable gnomon for aiming said directional **antenna** to the transmitter or receiver;

one or more calibration marks located on said adjustable gnomon that indicate calibration settings for adjusting said adjustable gnomon to aim the directional **antenna** toward an associated transmitter or receiver; and

aligning means for aligning said directional **antenna** such that a shadow cast by said adjustable gnomon substantially coincides with the predetermined target to thereby aim the directional **antenna**.

19. The directional **antenna** system of claim 18, further comprising:

a computer to calculate setting information which indicates which of said one or more calibration marks are to be used in adjusting said adjustable gnomon; and

adjusting means for adjusting said adjustable gnomon according to said setting information.

20. The directional **antenna** system of claim 19, wherein said computer farther comprises input means for entering location information into computer software, said computer software executing on said computer to output said setting information.

20 Claims, 11 Drawing figures
Exemplary Claim Number: 8
Number of Drawing Sheets: 11

US-PAT-NO: 4495706
DOCUMENT-IDENTIFIER: US 4495706 A
TITLE: Alignment gage for dish antenna
DATE-ISSUED: January 29, 1985
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kaminski; Elton G.	Sidney	OH	N/A	N/A

ASSIGNEE INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
The Stolle Corporation	Sidney	OH	N/A	N/A	02

APPL-NO: 6/ 399307
DATE FILED: July 19, 1982
INT-CL: [3] G01C017/18,G01C023/00
US-CL-ISSUED: 33/333,33/352 ,343/894
US-CL-CURRENT: 33/333,33/352 ,343/894
FIELD-OF-SEARCH: 33/18R;33/273 ;33/333 ;33/334 ;33/343 ;33/352 ;33/370 ;33/371 ;33/391 ;33/355 ;343/720 ;343/894

REF-CITED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
51675	December 1865	Abbott	33/273
377396	February 1888	Looker et al.	33/273
420242	January 1890	Nielsen	33/333
1097925	May 1914	Johnson	33/352
1448031	March 1923	Morris	33/352
3591925	July 1971	Dupin	33/391
3862500	January 1975	Wibom	33/352
4126865	November 1978	Longhurst et al.	343/894

FOREIGN PATENT DOCUMENTS

COUNTRY	FOREIGN-PAT-NO	PUBN-DATE	US-CL
FR	1231876	October 1960	33/391
CH	214225	July 1941	33/355

ART-UNIT: 246
PRIMARY-EXAMINER: Stearns; Richard R.
ATTY-AGENT-FIRM: Frost & Jacobs
ABSTRACT:
An alignment gage for accurately positioning the azimuth and elevation

angles of a fixed receiving dish antenna. The alignment gage is mounted to the dish and includes a gravity actuated pendulum cooperating with an arcuate scale for setting the elevational angle. A magnetic **compass** having a graduated scale is used to set the azimuth angle of the antenna. In one embodiment, the **compass** surmounts the pendulum so as to remain in a horizontal position. The gage is particularly adapted for use by unskilled persons for use in installing home dish antennas.

9 Claims, 11 Drawing figures

US-CL-CURRENT: 29/601,343/700MS ,343/846

US-PAT-NO: 5829121
DOCUMENT-IDENTIFIER: US 5829121 A
TITLE: Antenna making method
DATE-ISSUED: November 3, 1998
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Shoemaker; Kevin O.	Lafayette	CO	N/A	N/A
Marx; Randall P.	Wheat Ridge	CO	N/A	N/A

US-CL-CURRENT: 29/600,29/601 ,343/700MS ,343/846

ABSTRACT:
Single and multiple radiator element planar array antennas and a method of making are disclosed. A styrofoam dielectric substrate, a die cut conductive first layer, preferably copper foil, secured to one surface and a conductive second layer, preferably aluminum foil, on the other surface forms the ground plane. A cutting die of cutting blades in a required array on a cutting press is used to cut through the conductive layer and into the dielectric layer in a sandwich of the two to provide inexpensive, durable and dimensionally stable antennas.

CLAIMS:

What is claimed is:

1. A method of making a planar antenna comprising the steps of:

providing a sandwich of a selected length and width having a dielectric substrate and a conductive first layer secured to a planar first surface of said substrate,

cutting a complete peripheral outline of a single radiator

element in said
first layer with a die cutter so that said first layer is cut into said
radiator element inside said outline and an excess portion outside of and
entirely surrounding said outline, and removing said excess portion of said
first conductive layer, and

applying a second conductive layer to a planar second surface of said substrate
opposite said radiator element to form a ground plane.

2. A method of making a planar array antenna comprising the steps of:

providing a dielectric substrate with a planar first surface and a planar
second surface opposite said first surface,

securing a conductive first layer over said first surface to form a sandwich,

after said step of securing, cutting a complete peripheral outline of a planar
array in said first layer with a die cutter so that said first layer is cut
into said planar array inside said outline and an excess portion outside of and
entirely surrounding said outline,

after said step of cutting, removing said excess portion of said first layer,
and

after said step of removing, securing a conductive second layer to said second
surface of said substrate to form a ground plane.

3. The method as set forth in claim 2 wherein said step of cutting consists of
making a single cut with said die cutter.

4. The method as set forth in claim 3 further comprising the step of:

soldering a feedpin to said planar array after said step of removing said excess portion.

5. The method as set forth in claim 4 wherein said planar array includes a plurality of radiator elements, a common feedpoint area and a feedline from each said radiator element to said feedpoint area.

6. The method as set forth in claim 5 wherein said step cutting a complete peripheral outline includes cutting a complete peripheral outline of a plurality of planar arrays.

7. The method as set forth in claim 4 wherein said planar array is a single radiator element.

7 Claims, 12 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 5

US-PAT-NO: 5351060
DOCUMENT-IDENTIFIER: US 5351060 A
TITLE: **Antenna**
DATE-ISSUED: September 27, 1994
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bayne; Gerald A.	83600 Frejus	N/A	N/A	FRX

APPL-NO: 7/ 840498
DATE FILED: February 24, 1992
FOREIGN-APPL-PRIORITY-DATA:
  FOREIGN-PRIORITY:
  FOREIGN-PRIORITY-APPL-NO: FR 91 400507
  FOREIGN-PRIORITY-APPL-DATE: February 25, 1991
INT-CL: [5] H01Q003/00
US-CL-ISSUED: 343/766,343/709 ,343/757 ,343/781CA ,342/359
US-CL-CURRENT: 343/766,**342/359** ,343/709 ,343/757 ,343/781CA
FIELD-OF-SEARCH: 343/755;343/757 ;343/766 ;343/781CA ;343/781P ;343/840 ;342/140 ;342/158 ;342/359

REF-CITED:

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PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
3696432	October 1972	Anderson et al.	343/757
3745582	July 1973	Karikomi et al.	343/758
4173762	November 1979	Thompson et al.	343/759
4305075	December 1981	Salvat et al.	343/781CA
4675688	June 1987	Sahara et al.	343/765
4786912	November 1988	Brown et al.	343/767
4811026	March 1989	Bissett	343/766
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5194874	March 1993	Perrotta	343/757

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COUNTRY	FOREIGN-PAT-NO	PUBN-DATE	US-CL
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EP	0084420	July 1983	343/766
EP	0154240	November 1985	
EP	0227930	August 1987	
EP	0403684	December 1990	
DE	1466380	February 1969	
JP	0298183	December 1988	
GB	653464	May 1951	

US-CL-CURRENT: 343/704,343/840

US-PAT-NO: 6208314
DOCUMENT-IDENTIFIER: US 6208314 B1
TITLE: Satellite reception **antenna**
DATE-ISSUED: March 27, 2001
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bourquin; Patrick	Beaucourt	N/A	N/A	FRX

US-CL-CURRENT: 343/872,343/704 ,343/840

ABSTRACT:
A reception **antenna**, applicable to the field of television signal transmission, for picking up signals originating from a stationary satellite which has a paraboloid reflector capable of reflecting signals received and concentrating them in a focal point where a source is arranged for guiding the signals towards a frequency converter. The source and the reflector are located inside a polyhedral housing permeable to electromagnetic waves and its lower surface is designed to be placed horizontally when the receiving **antenna** is being used, the relative positioning of the source and the reflector with respect to the housing lower surface has a predetermined on-site adjustment originally built in. The relative positioning takes into account the elevation angle corresponding to the **position** of the targeted satellite.

CLAIMS:

What is claimed is:

1. A reception **antenna** intended for picking up signals from a geostationary satellite (15), comprising a paraboloid-shaped reflector (10) able to reflect the signals received and to concentrate them at a focal point whereat is

arranged a source (11) able to guide said signals towards a frequency converter (13), wherein the source (11) and the reflector (10) are arranged inside a polyhedral casing (1), which is permeable to electromagnetic waves and whose lower face (4) is intended to be placed horizontally when using the reception **antenna,** the relative positioning of said source (11) and of said reflector (10) with respect to said lower face (4) of the casing (1) incorporating the angle of elevation corresponding to the **position** of the geostationary satellite (15) wherein at least part of the upper face (6) of the casing (1) lies in a plane secant to the plane passing through the lower face (4) of said casing (1).

2. The reception **antenna** as claimed in claim 1, wherein the frequency converter (13) is arranged inside the polyhedral casing (1).

3. The reception **antenna** as claimed in claim 1, wherein the casing (1) comprises an occludable aperture (9) allowing maintenance of the various components present inside.

4. The reception **antenna** as claimed in claim 1, wherein the casing (1) is completely sealed.

5. The reception **antenna** as claimed in claim 1, wherein the casing (1) encloses means for capturing moisture.

6. The reception **antenna** as claimed in claim 1, wherein the casing (1) comprises heating means able to allow snow to be cleared from its upper face (6).

7. The reception **antenna** as claimed in claim 1, wherein the casing (1) is made at least in part of polyvinyl chloride.

8. The reception **antenna** as claimed in claim 1, wherein the casing (1) encloses an internal lighting system (14) and wherein at least one part (7) of the upper face (6) of said casing (1) is made with a translucent material which is permeable to electromagnetic waves.

9. A process for **installing** a reception **antenna** intended for picking up signals from a geostationary satellite, comprising a paraboloid-shaped reflector able to reflect the signals received and to concentrate them at a focal point whereat is arranged a source able to guide said signals towards a frequency converter, wherein the source and the reflector are arranged inside a polyhedral casing, which is permeable to electromagnetic waves and whose lower face is intended to be placed horizontally when using the reception **antenna**, the relative positioning of said source and of said reflector with respect to said lower face of the casing incorporating the angle of elevation corresponding to the **position** of the geostationary satellite wherein at least part of the upper face of the casing lies in a plane secant to the plane passing through the lower face of said casing, and wherein said process comprises the operations consisting in:

digging in the ground (16) a hole (17) of a volume substantially equal to the dimensions of the casing (1), said hole (17) being oriented substantially along the azimuthal direction of the targeted satellite (15),

depositing a bed of sand (18) in the bottom of the hole (17),

positioning the casing (1) horizontally on the bed of sand (18), this time
accurately checking the azimuthal direction with a **compass**.
9 Claims, 1 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 1

GB	934057	August 1963
GB	934058	August 1963
GB	1136174	December 1968
GB	1171401	November 1969
GB	1495298	December 1977
GB	2173643	October 1986

ART-UNIT: 254
PRIMARY-EXAMINER: Hajec; Donald
ASSISTANT-EXAMINER: Ho; Tan
ATTY-AGENT-FIRM: Goldberg; Richard M.

ABSTRACT:

A satellite television receiver **antenna** for use on seaborne vessels comprises a Cassegrain **antenna** including a parabolic main reflector, and a hyperbolic sub-reflector mounted at an angle slightly opposite from the center axis of the parabolic reflector, the sub-reflector being driven by a motor to rotate so as to cause the **antenna** reception pattern to perform a conical scan around the main axis of the parabolic reflector. The rotational speed is an even multiple of the frequency of any amplitude modulation of the received signal, or of any electrical interference, and the received signal is measured at points rotationally spaced apart 180 degrees, so that the effects of modulation and/or electrical interference are cancelled. The measured signal strength at four **positions** spaced rotationally by 90.degree. is used to derive power signals to drive pulse width modulation control azimith and elevation motors.

12 Claims, 22 Drawing figures

US-CL-CURRENT: 33/333,33/356 ,33/370 ,73/1.76

US-PAT-NO: 5095631
DOCUMENT-IDENTIFIER: US 5095631 A
TITLE: Magnetic **compass**
DATE-ISSUED: March 17, 1992
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Gavril; Solomon	Kiryat Yam	N/A	N/A	ILX
Zeiler; Eitan	Haifa	N/A	N/A	ILX
Mor; Avigdor	Kiryat Bialik	N/A	N/A	ILX
Netzer; Yshay	Yuvalim	N/A	N/A	ILX

US-CL-CURRENT: 33/361,33/333 ,33/356 ,33/370 ,73/1.76

ABSTRACT:
An electronic **compass** system for determining the heading of an armored vehicle containing a large mass of ferromagnetic material, which system comprises a plurality of sensors, and for real-time computation of the corrections required of actual magnetometer measurements. Part of the values used for the computation are computed in advance, and part in real-time. Some of the computations are based on the perturbation of the earth magnetic field based on an algorithm which takes into account one or two rotational prolate ferromagnetic ellipsoids which have certain dimensions and which are at a predetermined distance from each other either represent the body of an armored vehicle, or when two ellipsoids are used, they represent the hull and turret of a tank.

CLAIMS:

We claim:

1. An electronic magnetic **compass** system for determining the heading of a
portion of a heavily armored vehicle, comprising in combination: a biaxial
fluxgate magnetometer positioned in an **antenna**-like structure in a **position**
above a highest level of the vehicle for determining magnetic field components
with respect to the vehicle; two inclinometers for determining pitch and tilt
angles of the vehicle with respect to a horizontal plane; computing means for
geometric correction of the magnetic field components dependent on the pitch
and tilt angles, for determining iron body perturbation of the local magnetic
field of the earth due to one or more rotational prolate ferromagnetic
ellipsoids of predetermined dimensions and **position** relative to each other,
representing iron body portions of said vehicle, for perturbation correction of
the magnetic field components, and for determining the heading of a portion of
the vehicle dependent on the geometric and perturbation corrections.

2. A system according to claim 1, further comprising external computer means
attached to a magnetic **compass** for determining a **position for installing** the
magnetometer for a specific class of armored vehicles and for each individual
member of such class.

3. A system according to claim 1, in which

the magnetometer and inclinometers continually generate measurement signals in
real time and

computing means continually determines corrected heading in real time and
include:

means for determining the components of the magnetic field in the horizontal
plane dependent on pitch and tilt angles and on magnetic field components
measured along the axes of the fluxgate magnetometer,

means for determining iron-body perturbation values,

means for subtracting the perturbation values from the magnetic field
components in the horizontal plane,

means for determining the corrected **azimuth** and

means for displaying the results which indicate the heading of the vehicle.

4. A system according to claim 1, in which computing means include means for
determining the iron body perturbation of the local magnetic field of the earth
depending on a limited number of parameters depending on the class of the
vehicle.

5. A system according to claim 1, in which computing means include means for:

projecting measured components of the magnetic field to the horizontal plane;

determining an approximate heading of the vehicle;

determining iron body perturbation;

correcting projected magnetic field components dependent on said perturbation;

determining a corrected **azimuth** based on the corrected

components;

checking results for convergence based on the corrected **azimuth** to determine
accuracy of results; and

continuing such correcting of components, determining of **azimuth** and checking
of convergence depending upon the accuracy of results.

6. A system according to claim 1, further comprising external computing means
for:

determining optimum magnetometer location depending on calibration files
gathered during a setup stage of said **compass** system; and

determining dimensions and relative **position** of said ellipsoids upon which said
determination of iron body perturbation depends.

7. A system according to claim 6, in which, in order to optimize correction of
the magnetic field components, said external computing means include means for:

inputting, during a data acquisition stage in which a true magnetic heading is
known, magnetic field inclination angle signals for a set of traverse angles of
the portions of the vehicle with respect to each other;

determining optimum values for fixed magnetization of said ellipsoids;

determining optimum dimensions and **position** of said ellipsoids;

determining optimum magnetic permeability for said ellipsoids;

determining optimum positioning for the magnetometer; and

outputting result signals for said determinations.

8. A system for measurement with adequate accuracy the heading of a heavily armored vehicle by **compass** means, by correcting magnetic perturbations due to residual and temporary magnetization of the body of such vehicle, which system comprises:

a biaxial fluxgate magnetometer on the vehicle in a **position** selected to optimize correction of flux measurement signals generated by the magnetometer;

pendulum-type inclinometers for outputting electrical measurement signals corresponding to inclination angles of the vehicle with respect to horizontal plane;

an A/D+MUX card for receiving and processing such measurement signals;

a microprocessor based unit communicating with such card for real time signal corrections;

a non-volatile memory apparatus communicating with the microprocessor to direct microprocessor function based on models within the memory representing mathematical procedures;

control and display panels in the vehicle for displaying signals output from the microprocessor;

interconnecting cables between the above parts,

and in which the memory includes a model of one or more prolate ferromagnetic
ellipsoids of predetermined size and **position** relative to each other
representing respective portions of the vehicle to direct the microprocessor to
correct signals input from the card to generate corrected signals output to the
panels.

9. A system according to claim 1, in which computing means include, means for
computing the values of .delta.H.sub.x and .delta.H.sub.y by an iterative
process and for subtracting these from the measured values H.sub.x and H.sub.y
of the magnetometer for providing a corrected **azimuth** angle.

10. A system of claim 1, in which:

the armored vehicle is a main battle tank including a hull and a rotatable
turret bearing a gun;

the perturbation due to two independently rotatable ferromagnetic ellipsoids
representing the hull and turret of the tank is determined; and

the system further comprises:

means for measuring the angle between the hull and the turret.

11. The system of claim 8, in which:

the heavily armored vehicle is a main battle tank with a hull and a turret
bearing a gun;

the memory includes a model of two ellipsoids representing the turret and hull respectively; and

the system further comprises:

an angle measuring device for determining the angle of rotation between the turret and hull.

12. The system of claim 1, in which computing means include apparatus representing the following equations for converting input signals H.sub.x and H.sub.y corresponding to measured magnetic field components in the horizontal plane into output signals .delta.H.sub.x and .delta.H.sub.y, corresponding to unperturbed magnetic field components: ##EQU4##

12 Claims, 10 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 5

US-CL-CURRENT: 33/333,33/354

US-PAT-NO: 5647134
DOCUMENT-IDENTIFIER: US 5647134 A
TITLE: Compass for mobile satellite antennas
DATE-ISSUED: July 15, 1997
INVENTOR-INFORMATION:

NAME COUNTRY	CITY	STATE	ZIP CODE
Chou; Shiau-fong TWX	Peitou Dist., Taipei	N/A	N/A

US-CL-CURRENT: 33/355R,33/333 ,33/354
ABSTRACT:
A compass for mobile parabolic antenna includes a compass sphere having a transparent shell with an elevation dial and a magnetic core encapsulated by the transparent shell with fluid filled therebetween with a bubble enclosed within the transparent shell and a directional mark pointing to a fixed direction on the magnetic core, an annular plate having a location dial and a satellite name dial provided on edges of the plate, a cover plate having a central hole and a plurality of arcuated grooves, and a base plate having a circular depression, a plurality of arcuated recesses corresponding to the grooves on the cover plate defined in the depression, and a central bore corresponding to the central hole on the cover plate so that the compass sphere can be secured within the central hole and the central bore and the annular plate can be rotatably received by the circular depression when the cover plate couples with the base plate.

CLAIMS:

I claim:

1. A compass for a mobile parabolic antenna comprising:

a compass sphere having a transparent shell with an elevation dial and a
magnetic core encapsulated by the transparent shell with fluid filled
therebetween with a bubble enclosed within the transparent shell and a
directional mark pointing to a fixed direction on the magnetic core;

an annular plate having a location dial and a satellite name dial provided on
edges of the plate;

a cover plate having a central hole and a plurality of arcuated openings; and

a base plate having a circular depression, a plurality of arcuated recesses
corresponding to the openings on the cover plate defined in the depression, and
a central bore corresponding to the central hole on the cover plate so that the
compass sphere can be secured within the central hole and the central bore and
the annular plate can be rotatably received by the circular depression when the
cover plate couples with the base plate.

1 Claims, 4 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 4

US-CL-CURRENT: 33/333,33/354

US-PAT-NO: 5647134
DOCUMENT-IDENTIFIER: US 5647134 A
TITLE: Compass for mobile satellite antennas
DATE-ISSUED: July 15, 1997
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chou; Shiau-fong	Peitou Dist., Taipei	N/A	N/A	TWX

US-CL-CURRENT: 33/355R,33/333 ,33/354
ABSTRACT:

A compass for mobile parabolic antenna includes a compass sphere having a transparent shell with an elevation dial and a magnetic core encapsulated by the transparent shell with fluid filled therebetween with a bubble enclosed within the transparent shell and a directional mark pointing to a fixed direction on the magnetic core, an annular plate having a location dial and a satellite name dial provided on edges of the plate, a cover plate having a central hole and a plurality of arcuated grooves, and a base plate having a circular depression, a plurality of arcuated recesses corresponding to the grooves on the cover plate defined in the depression, and a central bore corresponding to the central hole on the cover plate so that the compass sphere can be secured within the central hole and the central bore and the annular plate can be rotatably received by the circular depression when the cover plate couples with the base plate.

CLAIMS:

I claim:

1. A compass for a mobile parabolic antenna comprising:

US-CL-CURRENT: 33/1SC,33/268 ,33/273

US-PAT-NO: 5276972
DOCUMENT-IDENTIFIER: US 5276972 A
TITLE: Satellite locator
DATE-ISSUED: January 11, 1994
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Staney; Michael W.	Jensen Beach	FL	N/A	N/A

US-CL-CURRENT: 33/271,33/1SC ,33/268 ,33/273

ABSTRACT:
An apparatus which can be carried to a field sight to locate current and future **positions** of geosynchronous satellites orbiting the equator in the Clark Belt Altitude. The apparatus corrects the error in viewing angle by providing corrections in longitude and latitude deviations caused by the location of the **antenna**. The apparatus will provide the user a means of accurately locating a satellite with regard to existing terrain and the obstacles which would interfere with signals between the ground **position** and the satellite.

CLAIMS:

What is claimed is:

1. A satellite locator apparatus for positioning an **antenna** comprising:

a base member which attaches to a stand;

a **compass** dial;

an elevation bar;

a bolt to connect said base member to said **compass** dial and to said elevation
bar which allows said **compass** dial and elevation bar to rotate in an angular
direction;

a vertical level attached to a first end of said elevation bar;

a declination holder attached to said first end of said elevation bar;

a declination insert to insert into said declination holder;

a **compass**, which is attached to said first end of elevation bar, located
between said declination holder and said bolt;

a view window attached to a second end of elevation bar;

a horizontal level, which is attached to said second end of said elevation bar,
located between said view window and said bolt.

2. A satellite locator apparatus as claimed in claim 1, wherein said stand is
a tripod.

3. A satellite locator apparatus as claimed in claim 1, wherein said **compass**
dial has markings for 360 degrees.

4. A satellite locator apparatus as claimed in claim 3, wherein said markings
on said **compass** dial include North at 0.degree., East at 90.degree., South at
180.degree. and West at 270.degree..

5. A satellite locator apparatus as claimed in claim 1, wherein said elevation
bar is transparent.

6. A satellite locator apparatus as claimed in claim 1, wherein said elevation
bar has a longitudinal line running from said **compass** to said horizontal level.

7. A satellite locator apparatus as claimed in claim I, wherein said bolt has
a smooth surface when passing through said elevation bar and said **compass** dial
and is threaded at said base member.

8. A satellite locator apparatus as claimed in claim 1, wherein said view
window is circular.

9. A satellite locator apparatus as claimed in claim 1, wherein said
horizontal level is a bubble level.

10. A satellite locator apparatus as claimed in claim 1, wherein said
declination insert has cross hairs which are positioned differently for each
site latitude.

11. A satellite locator apparatus for positioning an **antenna** comprising:

a base means for attaching said apparatus to a stand;

a dial means for determining a azimuthal direction;

a vertical level means for determining a vertical **position**;

a horizontal level means for determining a horizontal **position**;

a declination means for determining a declination of a desired object;

a direction means for determining magnetic North;

a viewer means for locating said desired object;

a bar means for supporting said vertical level means, said horizontal level
means, said declination means, said viewer means and said direction means;

an attaching means for attaching said bar means, said dial means and said base
means.

12. A satellite locator apparatus as claimed in claim 11, wherein said stand
is a tripod.

13. A satellite locator apparatus as claimed in claim 11, wherein said dial
means has angular markings in degrees.

14. A satellite locator apparatus as claimed in claim 11, wherein said
horizontal level means is a bubble level.

15. A satellite locator apparatus as claimed in claim 11, wherein vertical
level means has angular markings in degrees.

16. A satellite locator apparatus as claimed in claim 11, wherein said
declination means has cross hairs which are determined by each site's specific
latitude.

17. A satellite locator apparatus as claimed in claim 11, wherein direction
means is a **compass**.

18. A satellite locator apparatus as claimed in claim 11, wherein said bar means is transparent.

19. A satellite locator apparatus as claimed in claim 11, wherein attaching means is a bolt which has a threaded distal end to attach to said base means.

20. A method for locating a satellite in order to **position an antenna** comprising the steps of:

leveling a satellite locator;

aligning a marking on an elevation bar with magnetic South direction;

adjusting a dial to be lined up with said markings on said elevation bar;

moving said elevation bar in a vertical angular direction to a desired angle;

moving said elevation bar in a horizontal angular direction to a desired angular **position**;

inserting proper declination insert into a declination holder;

checking line of sight for said **antenna** by looking through a view window and said declination insert.

21. A method of locating a satellite as claimed in claim 20, wherein aligning said marking on said elevation bar with magnetic South direction by using a **compass**.

22. A method of locating a satellite as claimed in claim 20, wherein sad
vertical angular direction and said horizontal angular direction is determined
by a table based on location of said **antenna** which has angular directions for a
desired satellite.

23. A method of locating a satellite as claimed in claim 20, wherein moving
said elevation bar in said vertical angular direction is done with a level with
angular markings.

24. A method of locating a satellite as claimed in claim 20, wherein moving
said elevation bar in said horizontal angular direction is done with said dial
with angular markings.

25. A method of locating a satellite as claimed in claim 20, wherein
declination insert is unique for each site's latitude.
25 Claims, 5 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 2

	Type	L #	Hits	Search Text
1	BRS	L1	4	antenna and install$4 adj method and alig$4
2	BRS	L2	3	5760739.URPN.
3	BRS	L3	2	antenna and install$4 adj method and compass
4	BRS	L4	30626	antenna and install$4 compass
5	BRS	L5	2	antenna and install$4 adj compass

	DBs	Time Stamp	Comments	Error Definition	Errors
1	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 10:52			0
2	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 10:46			0
3	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 10:54			0
4	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 10:54			0
5	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 10:55			0

	Type	L #	Hits	Search Text
6	BRS	L6	357	antenna and compass and position and azimuth
7	BRS	L7	27	antenna and compass and position and azimuth and installing
8	BRS	L8	0	6208314.URPN.
9	BRS	L9	3	5276972.URPN.
10	BRS	L10	4	5095631.URPN.

	DBs	Time Stamp	Comments	Error Definition	Errors
6	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:25			0
7	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 10:56			0
8	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 10:57			0
9	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:01			0
10	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:03			0

	Type	L #	Hits	Search Text
11	BRS	L11	3	4495706.URPN.
12	BRS	L12	3	4495706.URPN.
13	BRS	L13	0	antenna and alignment and compass and position and azimuth and 29/$.ccls.
14	BRS	L14	3	antenna and alignment and position and azimuth and 29/$.ccls.
15	BRS	L15	3	4120085.URPN.

	DBs	Time Stamp	Comments	Error Definition	Errors
11	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:04			0
12	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:19			0
13	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:21			0
14	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:21			0
15	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:23			0

	Type	L #	Hits	Search Text
16	BRS	L16	0	antenna and compass and position and azimuth and 29/$.ccls.
17	BRS	L17	4739	antenna and position and azimuth
18	BRS	L18	6	antenna and position and azimuth and 29/$.ccls.
19	BRS	L19	884	antenna and position and azimuth and 343/$.ccls.
20	BRS	L20	12	antenna and position and azimuth and 343/760.ccls.

	DBs	Time Stamp	Comments	Error Definition	Errors
16	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:25			0
17	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:26			0
18	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:27			0
19	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:28			0
20	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:28			0

	Type	L #	Hits	Search Text
21	BRS	L21	48	antenna and position and azimuth and 343/757.ccls.
22	BRS	L22	104	antenna and position and azimuth and 342/359.ccls.
23	BRS	L23	39	antenna and position and azimuth and 342/359.ccls. and alignment
24	BRS	L24	10	antenna and position and azimuth and 342/359.ccls. and alignment and compass
25	BRS	L25	2	antenna and position and azimuth and 33/270.ccls. and alignment

	DBs	Time Stamp	Comments	Error Definition	Errors
21	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:28			0
22	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:46			0
23	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:34			0
24	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:30			0
25	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:34			0

	Type	L #	Hits	Search Text
26	BRS	L26	24	("3696432" | "3745582" | "4173762" | "4305075" | "4675688" | "4786912" | "4811026" | "4827269" | "5194874").PN.
27	BRS	L27	0	antenna and azimuth and compass and movable and attaching and detaching
28	BRS	L28	0	antenna and azimuth and compass and attaching and detaching
29	BRS	L29	22	antenna and azimuth and compass and attaching

	DBs	Time Stamp	Comments	Error Definition	Errors
26	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:44			0
27	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:47			0
28	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:47			0
29	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM	2002/01/28 11:51			0

	U	1	Document ID	Issue Date	Pages
1	☐	☒	JP 07111410 A	19950425	7
2	☐	☒	US 6166700 A	20001226	8
3	☐	☒	US 6043788 A	20000328	21
4	☐	☒	US 5952966 A	19990914	15
5	☐	☒	US 5819185 A	19981006	30
6	☐	☒	US 5647134 A	19970715	7
7	☐	☒	US 4689635 A	19870825	6
8	☐	☒	US 5621418 A	19970415	5
9	☐	☒	US 5829121 A	19981103	9

	Title	Current OR
1	ELEVATOR FOR ANTENNA AND ANTENNA INSTALLING METHOD	
2	Satellite terminal antenna installation	343/761
3	Low earth orbit earth station antenna	343/781CA
4	Antenna assembly	342/373
5	Portable satellite communication apparatus	455/575
6	Compass for mobile satellite antennas	33/355R
7	Apparatus for orientating TV antennas for satellite reception	343/894
8	FM-very high frequency metal detector	343/742
9	Antenna making method	29/600

	Current XRef	Retrieval Classif	Inventor
1			HASHIDE, YUZO
2	343/840 ; 343/882		Jenkin, Keith R. , et al.
3	343/765 ; 343/781P ; 343/840		Seavey, John M.
4	342/359 ; 342/367		Smith, Martin Stevens
5	343/702 ; 455/226.2 ; 455/226.4 ; 455/90 ; 455/97		Umezawa, Koichi , et al.
6	33/333 ; 33/354		Chou, Shiau-fong
7			Haupt, Gene
8	343/741		Maloney, Daniel P.
9	29/601 ; 343/700MS ; 343/846		Shoemaker, Kevin O. , et al.

	S	C	P
1	☒	☐	☐
2	☒	☐	☐
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